

FIG. 1

16a

Quadrature Mach-Zehnder Modulation Device

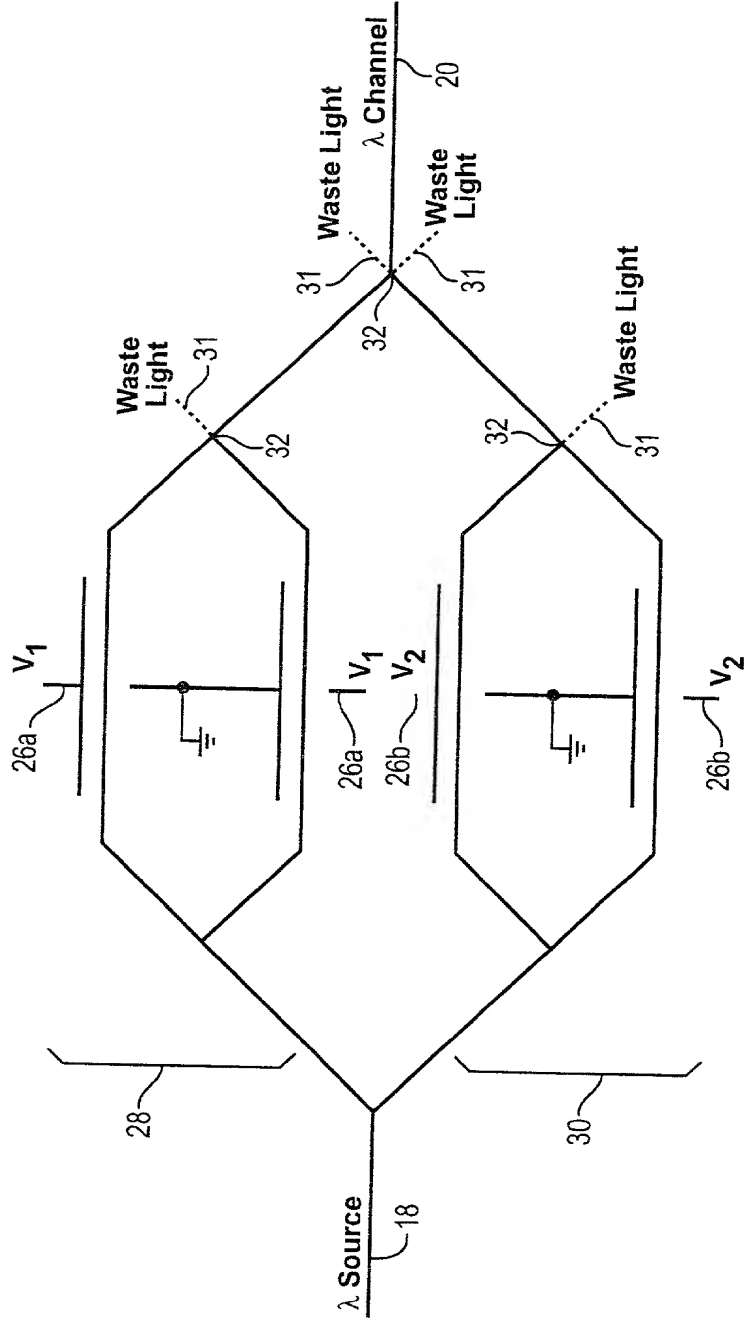


FIG. 2

FIG. 3 is a graph of the transfer function of a Mach-Zehnder device. The graph shows two sinusoidal curves, 34 and 36, plotted against the voltage Vm. Curve 34 is labeled f(Vm) = cos(Vm) and curve 36 is labeled f(ΔVm) = sin(ΔVm). The intersection of the two curves is marked as the 'Dark Point' 36.

**Mach-Zehnder Device
Transfer Function**

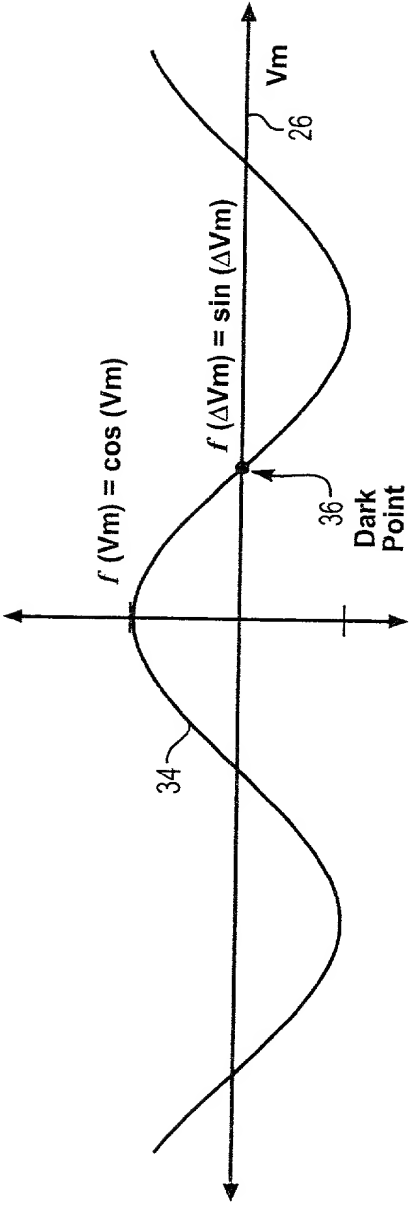


FIG. 3

FIG. 4 is a block diagram of a Modulation Synthesizer 12. The synthesizer includes an Error input 21, a Shift input 24, an integrator 38, a summing junction 42, a Total Shift output 44, and a Waveform Generator 46. The Error input 21 is connected to the integrator 38. The Shift input 24 is connected to the summing junction 42. The output of the integrator 38 is connected to the summing junction 42. The output of the summing junction 42 is the Total Shift output 44. The Total Shift output 44 is connected to the Waveform Generator 46. The Waveform Generator 46 produces the final output 26.

12

Modulation Synthesizer

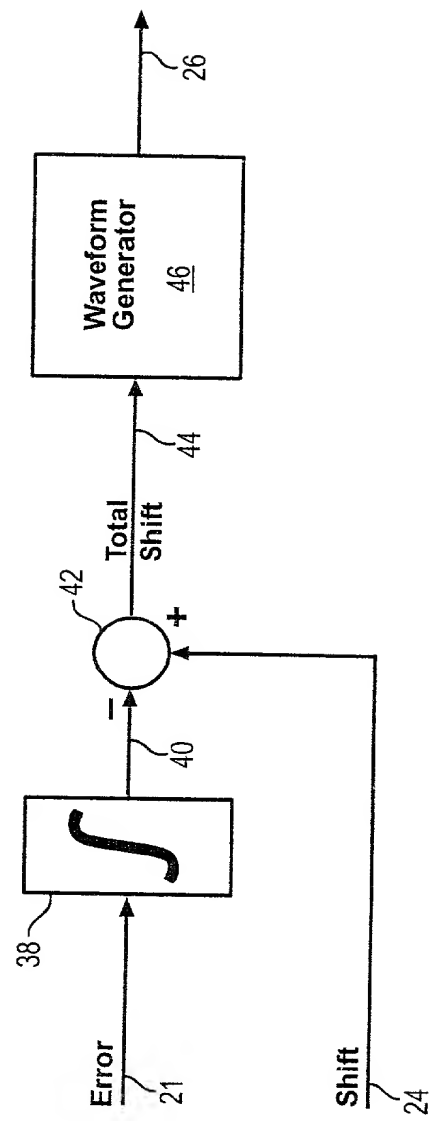


FIG. 4

FIG. 5 is a block diagram of a Quadrature Modulation Synthesizer (With On/Off Data Keying) according to the present invention.

12

Quadrature Modulation Synthesizer (With On/Off Data Keying)

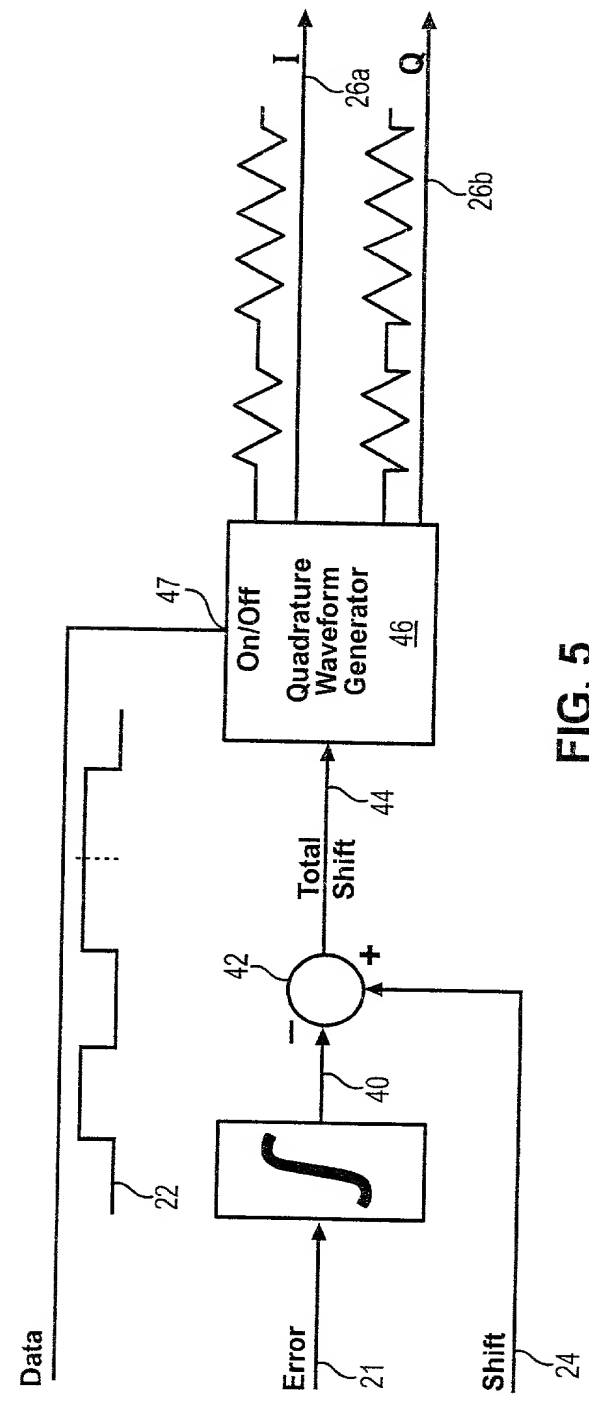


FIG. 5

Modulation Synthesizer (With Frequency Shift Keying)

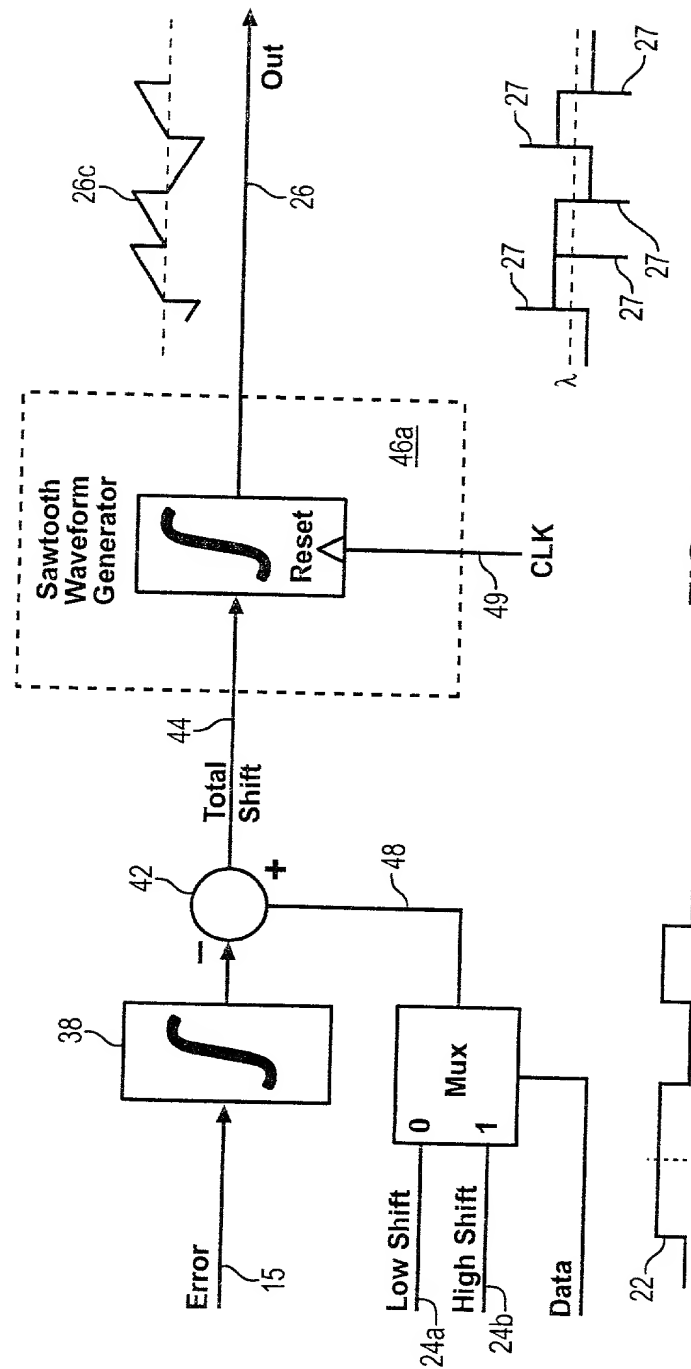


FIG. 7

Wavelength Error Detector (Fixed Wavelength)

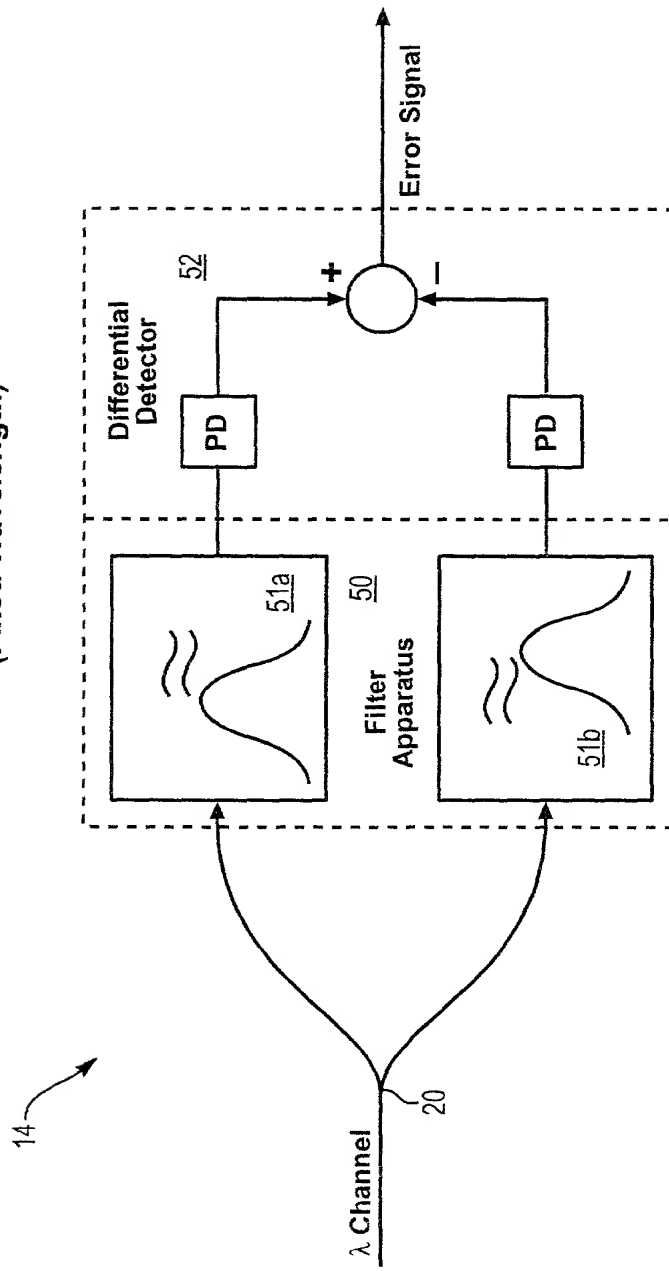


FIG. 8

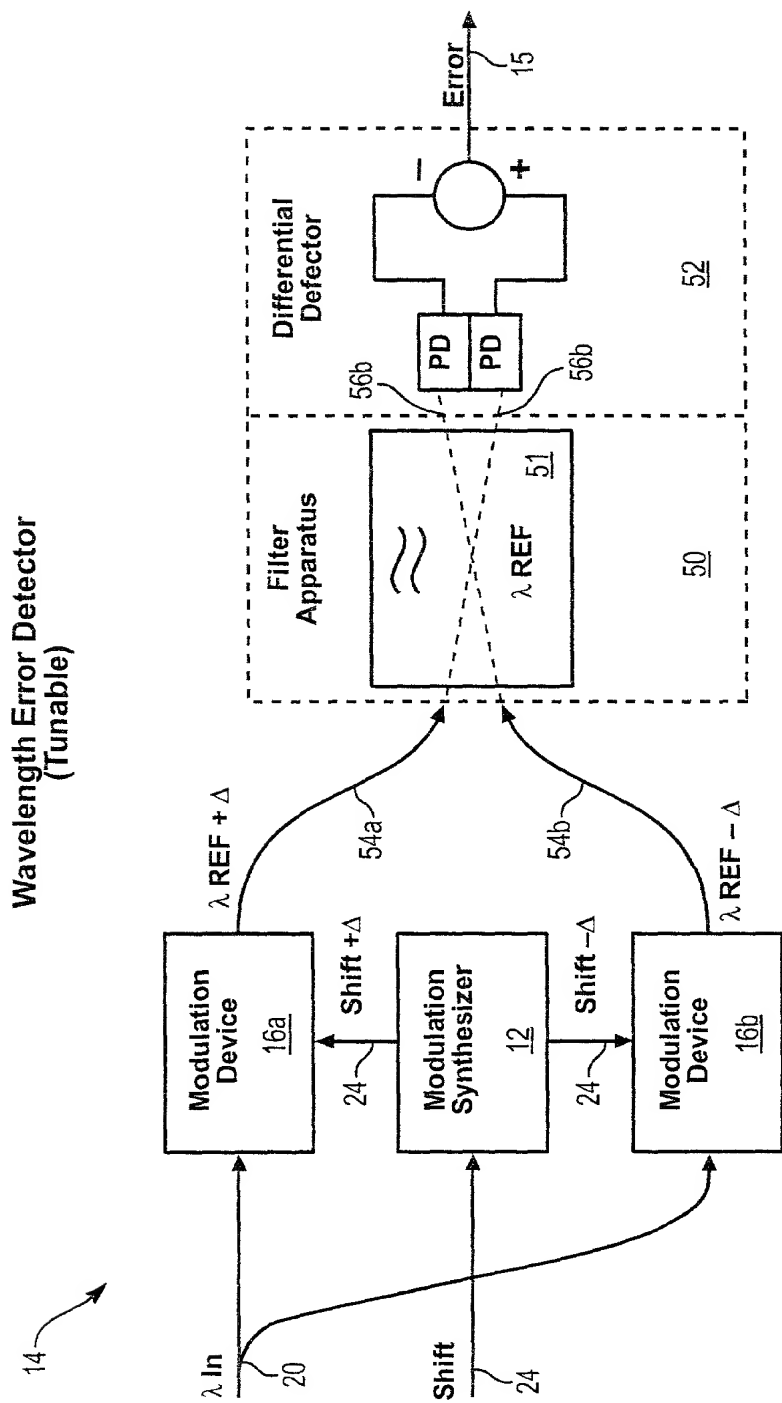


FIG. 9

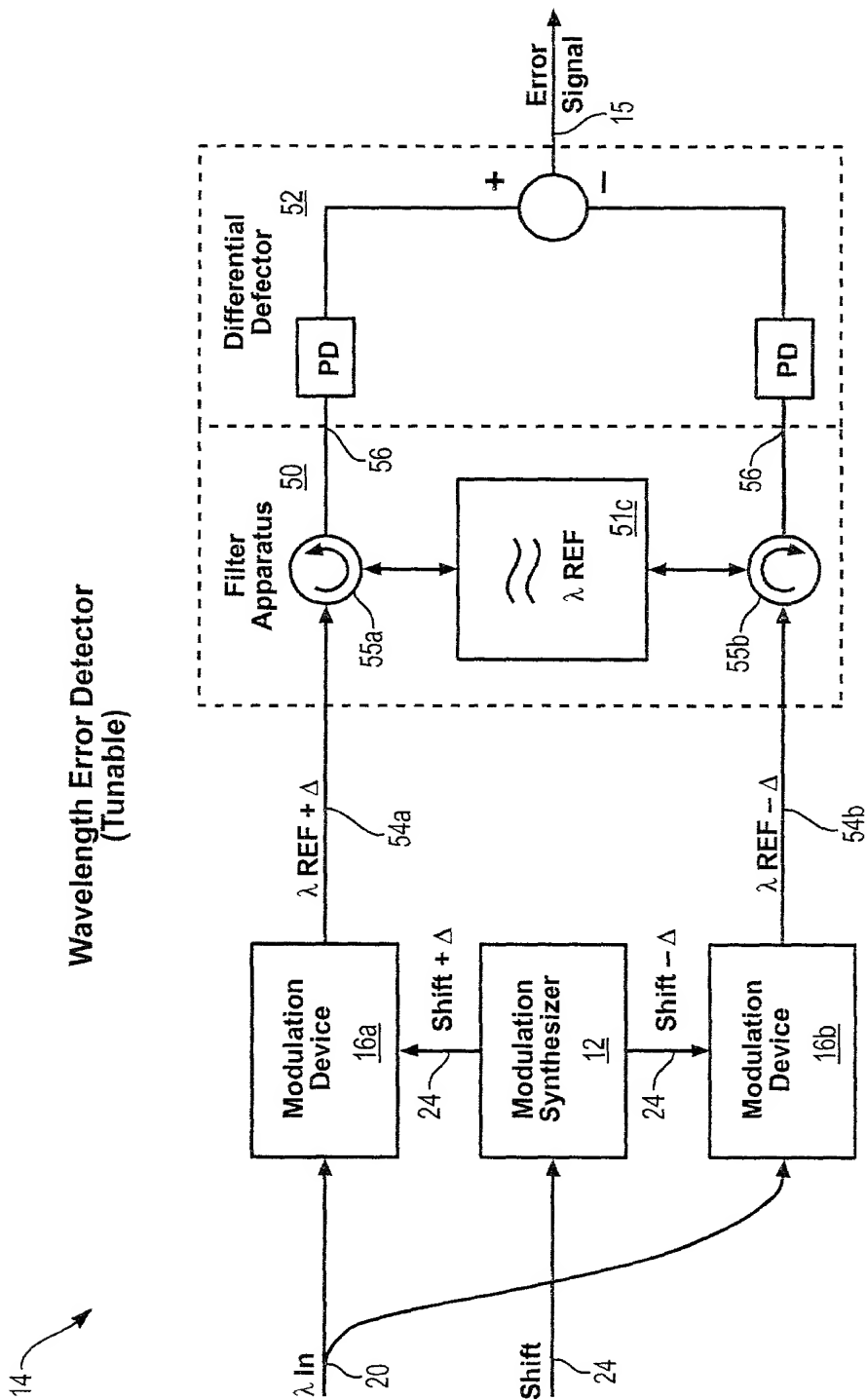


FIG. 10

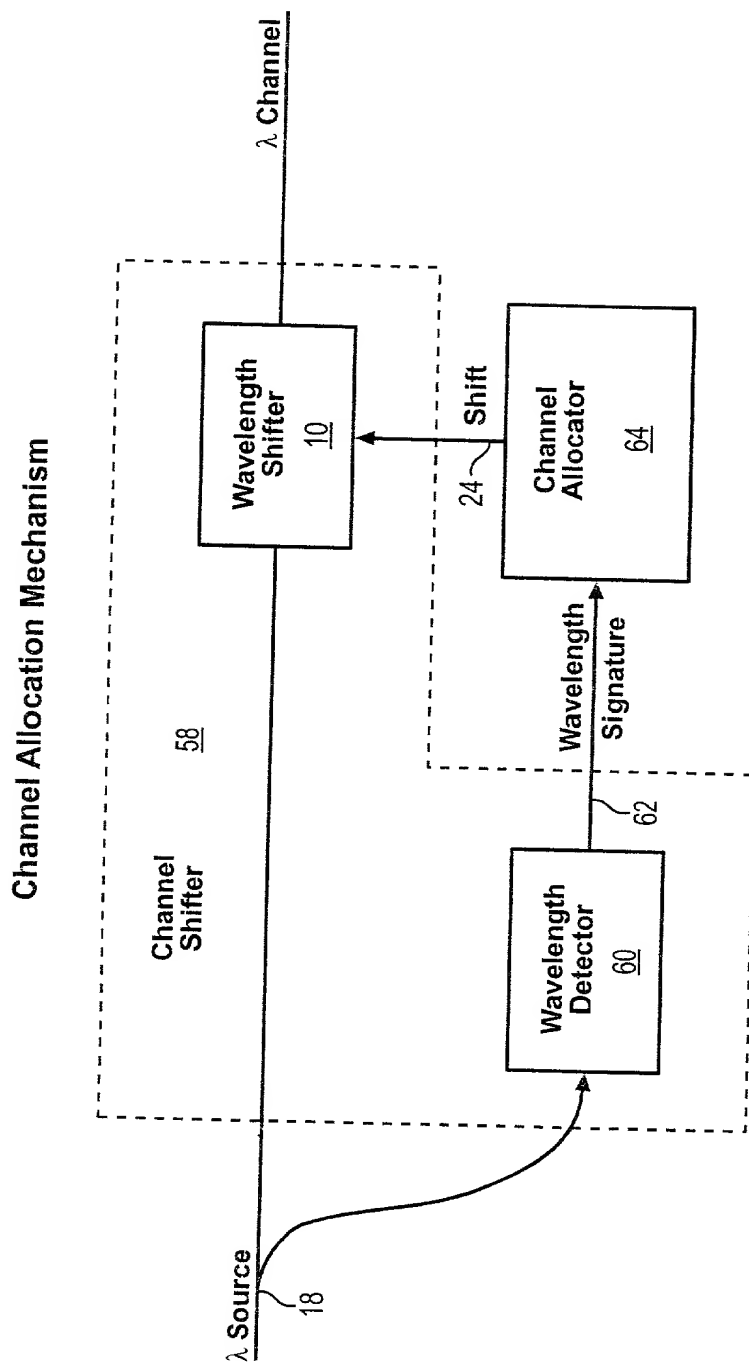


FIG. 11

70 →

Tunable Wavelength Stabilized Transmitter

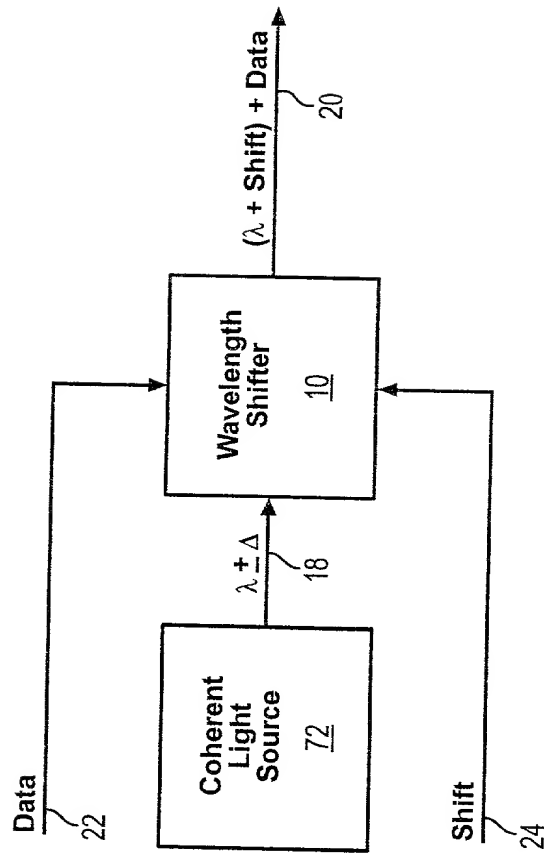


FIG. 12

74

Recursive Wavelength Shifter

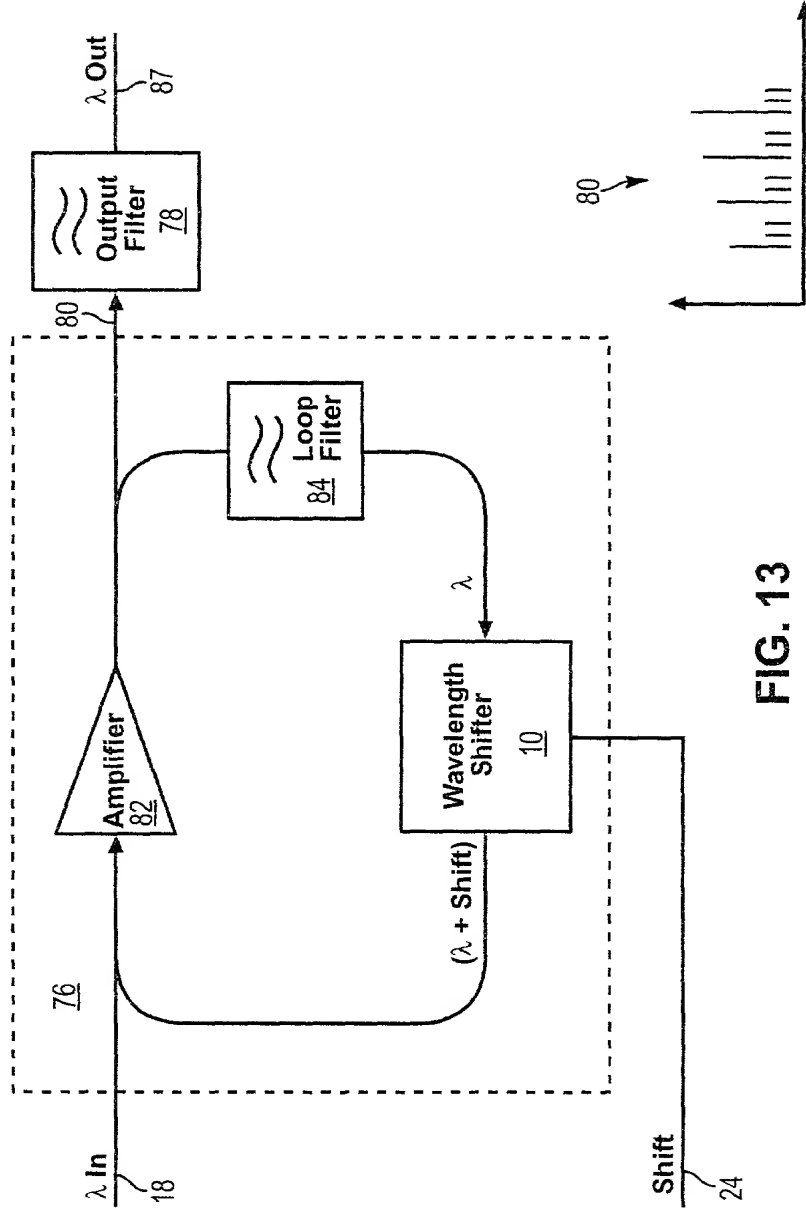


FIG. 13

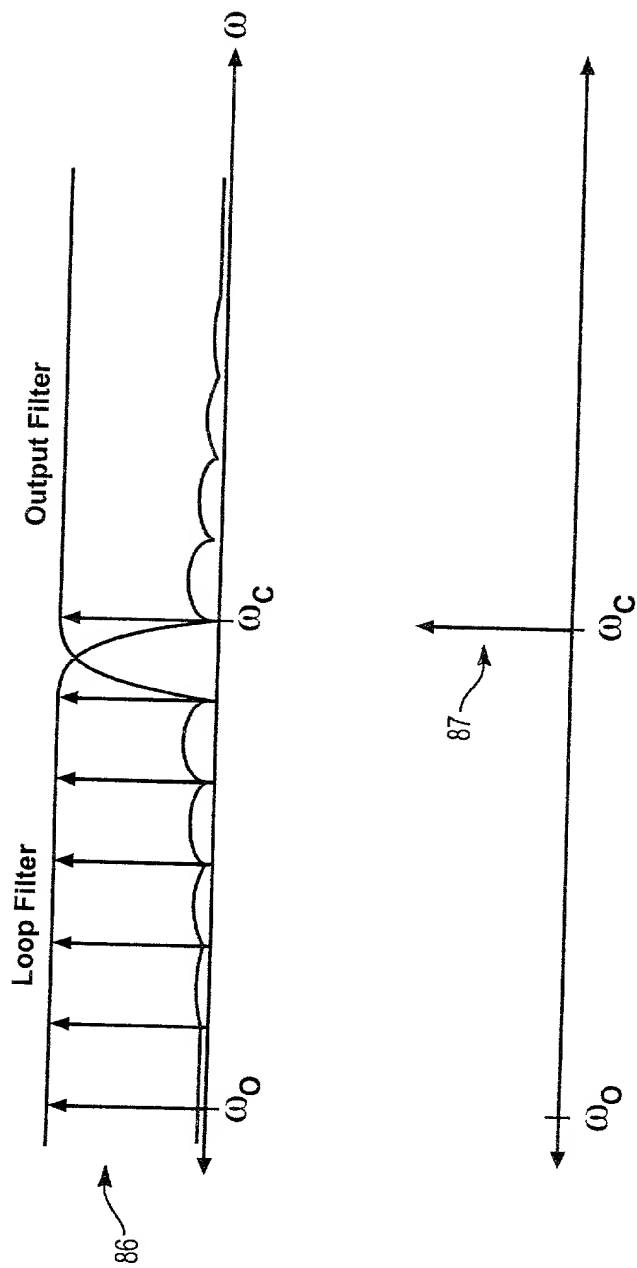


FIG. 14